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EXAMINER

PATEL, DEVANG R

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/790,023	<b>Applicant(s)</b> STREBELLE ET AL.	
	<b>Examiner</b> DEVANG PATEL	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9, 11 and 13-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11 and 13-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

**1. Claims 1-3, 5-7, 9, 11 and 13-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Grosch et al. (DE 19623611, of record) and in view of Hefele et al. (WO 98/37965, of record), and further in view of Sepulveda et al. (US 4613427, of record). *US 6458970 is taken to be the English-equivalent of WO 98/37965 and sections cited in the rejections below refer to the US Patent 6458970.*

a. **Regarding claim 1**, Grosch et al. ("**Grosch**") discloses a process for preparation of epoxides comprising reacting an olefinic with a peroxide in the presence of an epoxidation catalyst (abstract, pg 1) obtained by blending a mixture including a titanium zeolite powder, water, binder, molding assistants such as methyl cellulose, which acts as a plasticizer (examples). Grosch appreciates that auxiliary agents can be added for extrusion shaping process, the usual one being methyl cellulose (pg. 2).

Grosch does not expressly disclose a pore-forming substance that is distinct from the plasticizer. Hefele et al. ("**Hefele**", drawn to titanium-based oxidation catalyst) discloses adding various auxiliary agents (similar to Grosch) to the paste-like mass for catalyst production including binders and pore formers (col. 6, lines 51-53). Specifically, Hefele discloses pore formers such as cellulose, starch, oxalic acid, melamine or urea. Hefele further teaches that the

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type and amount of the auxiliary agents generally depends on the chemical composition of the active catalyst in question, the starting materials, and is advantageously optimized in an experiment for a particular catalyst composition to be produced in each case (col. 7, lines 7-19). Grosch discloses 10 wt% silica binder compared to the total weight of the catalyst (pg. 2). In view of Hefele, it would have been obvious to a person of ordinary skill in the art at the time of the invention to add claimed amount of binder and pore former in the epoxidation catalyst of Grosch in order to obtain desired activity of the catalyst composition. Moreover, the claim would have been obvious to an artisan since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

Neither Grosch nor Hefele expressly teaches an amount of 5-35 wt% of pore-forming substance. However, **Sepulveda** discloses exemplary pore-forming substances such as carbon, wood powder, polyethylene glycol, cellulose, methylcellulose, or melamine (similar to Hefele), in order to produce the optimum pore volume in the final catalyst (col. 4, lines 15-25). Sepulveda also discloses providing 8-30 wt% of pore-forming substance prior to extrusion. In the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a prima facie case of obviousness exists (MPEP 2144.05). It is also noted that similar to Grosch, Sepulveda further discloses the steps of extrusion and calcination to obtain final catalyst in the form of extrudates (col. 4, lines 25-45). The claim would have been obvious because choosing 5-35 wt% of pore former

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would have yielded the predictable results of obtaining an optimum pore volume to a person of ordinary skill in the art at the time of the invention.

Grosch teaches shaping the paste obtained above by extrusion and drying in order to remove at least some of water and calcining to remove at least some of the organic residues, forming pores and obtaining extruded granules (pg. 1).

b. **As to claim 2**, Grosch discloses the titanium zeolite having a crystalline structure of the ZSM-5, 11 types, wherein the binder is converted into catalyst matrix (pg 2).

c. **As to claim 3**, Grosch discloses the titanium zeolite having an IR absorption at about  $960\text{ cm}^{-1}$  (example 1).

d. **As to claim 5**, Grosch discloses cylindrical extruded granules with 2 mm diameter and length of 1-8 mm (examples).

e. **As to claim 6**, the catalyst of Grosch contains from 1-99 wt% titanium zeolite, the remainder being matrix.

f. **As to claims 7 and 11**, Grosch discloses methyl cellulose (plasticizer) is a polysaccharide and binder includes siloxane derivative.

g. **As to claim 9**, the amount of methyl cellulose in Grosch is between 1-10 wt% (examples).

h. **As to claim 13**, Sepulveda discloses a pore-forming substance (melamine) in an amount from 5-40 wt% to obtain an optimum pore volume in the final catalyst (col. 4, lines 20-25). The base material with respect to catalyst of Grosch is titanium zeolite. Grosch in view of Hefele and Sepulveda meets the

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claimed amount of 5-35 wt% relative to the weight of titanium zeolite as explained in claim 1 above. It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed weight ranges through process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

i. **Regarding claim 14**, Grosch discloses a process for preparation of propylene oxide (i.e. 1, 2 epoxypropane) comprising reacting propen (i.e. propylene) with hydrogen peroxide in the presence of an epoxidation catalyst (pg 2) obtained by blending a mixture including a titanium zeolite powder, water, binder, molding assistants such as methyl cellulose, which acts as a plasticizer (examples). Grosch appreciates that one or more auxiliary agents can be added for extrusion shaping process, the usual one being methyl cellulose (pg. 2).

Grosch does not expressly disclose a pore-forming substance that is distinct from the plasticizer. Hefele et al. ("**Hefele**", drawn to titanium-based oxidation catalyst) discloses adding various auxiliary agents to the paste-like mass for catalyst production including binders and pore formers (col. 6, lines 51-53). Specifically, Hefele discloses pore formers such as cellulose, starch, oxalic acid, melamine or urea. Hefele further teaches that the type and amount of the auxiliary agents generally depends on the chemical composition of the active catalyst in question, the starting materials, and is advantageously optimized in an experiment for a particular catalyst composition to be produced in each case (col.

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7, lines 7-19). Grosch discloses 10 wt% silica binder compared to the total weight of the catalyst (pg. 2). In view of HefeLe, it would have been obvious to a person of ordinary skill in the art at the time of the invention to add claimed amount of binder and pore former in the epoxidation catalyst of Grosch in order to obtain desired activity of the catalyst composition. Moreover, the claim would have been obvious to an artisan since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

Neither Grosch nor HefeLe teaches amount of 6-14 wt% of pore-forming substance. However, **Sepulveda** discloses exemplary pore-forming substances such as carbon, wood powder, polyethylene glycol, cellulose, methyLcellulose, or melamine (similar to HefeLe), in order to produce the optimum pore volume in the final catalyst (col. 4, lines 15-25). Sepulveda also discloses providing 8-30 wt% of pore-forming substance prior to extrusion. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists (MPEP 2144.05). It is also noted that similar to Grosch, Sepulveda further discloses the steps of extrusion and calcination to obtain final catalyst in the form of extrudates (col. 4, lines 25-45). The claim would have been obvious because choosing 5-35 wt% of pore former would have yielded the predictable results of obtaining an optimum pore volume to a person of ordinary skill in the art at the time of the invention.

Grosch teaches shaping the paste obtained above by extrusion and drying in order to remove at least some of water and calcining to remove at least some of the organic residues, forming pores and obtaining extruded granules (pg. 1).

**As to claim 15**, it would have been obvious to a person of ordinary skill in the art at the time of the invention to choose from 6 to 14 wt% of pore former in the epoxidation catalyst of Grosch for the reasons explained in claim 1 above.

2. **Claims 4 and 8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Grosch et al. (DE 19623611, of record) in view of Hefele et al. (US 6458970) and Sepulveda et al. (US 4613427, of record), and further in view of Balducci et al. (US 5965476, of record).

j. **As to claim 4**, none of the references above explicitly disclose the claimed formula. However, **Balducci** et al. (drawn to silica/zeolite composite preparation process) discloses titanium-silicalites catalysts satisfying the general formula  $x\text{TiO}_2(1-x)\text{SiO}_2$ , with x varying from 0.0005-0.04. It would have been obvious to a person of ordinary skill in the art at the time of the invention to use titanium silicalites having the claimed formula because they provide a particular selectivity in epoxidation reactions of olefins (col. 1, lines 13-18).

k. **As to claim 8**, Grosch discloses the powder having 60 mesh particle size distribution, but this is much larger than 10 micron. **Balducci** discloses that the silica/zeolite composite materials have particular selectivity in epoxidation reactions of olefins as stated in claim 4 above. Balducci discloses both titanium-silicalites and beta zeolites, in powder form, having submicronic particles of <1



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micron. Thus, it meets the limitation of powder having a mean diameter of less than 10 micron. Balducci further discloses that these materials are typically subjected to granulation processes, wherein the form and dimensions of the granules are dependent on various factors such as type of reactor, mass transport or heat phenomena limitations, or to control load losses of the catalytic bed (col. 1, lines 31-40). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed mean diameter of <10 micron through process optimization, since the dimensions are made suitable according to reactor type, mass transport or heat phenomena limitations, or to control load losses of the catalytic bed.

### ***Double Patenting***

The terminal disclaimer filed on 11/18/09 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US PAT 6,699,812 has been reviewed and is accepted. The terminal disclaimer has been recorded.

### ***Response to Amendment and Arguments***

Applicant's arguments with respect to claims 1 and 14 have been considered but are not persuasive.

With respect to Declaration under 37 CFR 1.132, the Declaration was found insufficient for the reasons explained in the final rejection dated 11/19/08.

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Applicant argues that Grosch is silent about the use of binder in an amount of more than 5% and less than 20%. In response, Examiner points out that Grosch teaches 10 wt% silica binder in the catalyst (pg. 1). Examiner further contends that in light of Hefe's teaching that the amount and type of binder (silica) and pore former can be advantageously optimized by experiments for a particular catalyst composition in question, one of ordinary skill in the art would have found it obvious to choose the instantly claimed weight range through process optimization.

Applicant argues that Hefe does not teach epoxidation catalysts and does not refer to extrusion or titanium zeolite catalysts. With respect to extrusion, Examiner points out that the steps for making the catalyst (by extrusion) don't further limit the process for using the catalyst to make the claimed epoxides because those steps are product by process limitations within a process of using claim (for epoxides). Only the structural limitations in steps (a)-(d) (i.e. titanium zeolite, silicon) further limits the catalyst used in the method for making the epoxides. In response to applicant's arguments against the Hefe references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references (Grosch discloses titanium zeolite epoxidation catalyst). Applicant argues that Grosch and Hefe do not relate to the same field. Examiner respectfully disagrees and contends that Hefe is an analogous art since it relates to the field of preparation of oxidation catalysts.

Applicant argues that one skilled in the art would not combine Sepulveda with the teachings of Grosch/Hefe since Sepulveda does not disclose epoxidation catalysts. In

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response, Examiner submits that similar to extrusion process of Grosch, Sepulvada teaches preparing a catalyst by extruding a mixture which includes pore-forming substance (such as methylcellulose). Hefele also discloses catalyst preparation mixture which includes pore-forming substances such as cellulose, methylcellulose, starch, melamine etc. and further teaches optimizing the amount depending on the desired catalyst composition. In view of collective disclosures of Grosch, Hefele and Sepulvada, it would have been obvious to a person of ordinary skill in the art to choose instantly claimed amount of pore-former in order to obtain desired catalyst composition.

Applicant also argues that Sepulvada does not disclose claimed amount of binder. Examiner notes that such argument is immaterial since the rejection does not rely on Sepulvada for the limitation of the binder.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the art would have reasonably understood from the texts. Only specific portions of the texts have been pointed out to emphasize certain aspects of the prior art, however, each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

Applicant is reminded to specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. 1.121; 37 C.F.R. Part 41.37; and MPEP 714.02.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVANG PATEL whose telephone number is (571)270-3636. The examiner can normally be reached on Monday thru Thursday, 8:00 am to 5:30 pm, EST..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devang Patel/

Examiner, Art Unit 1793

/Jessica L. Ward/

Supervisory Patent Examiner, Art Unit 1793